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hangar. Unfortunately, he found the airplane's brakes now without pressure and could only watch in horror as the aircraft rolled into the hangar (barely missing other research airplanes) and penetrated the building's southwest wall. This spawned a frequently repeated joke that Chuck Yeager (first pilot to exceed the speed of sound) may have broken the sonic wall, but Crossfield broke the hangar wall.

On Sept. 1, 1959, NASA crew chief Bob Allen fastened Crossfield into the North American F-107A in preparation for a familiarization flight. He warned Crossfield not to taxi the aircraft too fast, as there was risk of a brake fire. Just before closing the cockpit, Allen told Crossfield, "This is the aircraft that separates the men from the boys." As Crossfield taxied across the lakebed the brakes caught fire and the aircraft ground looped. It was damaged enough to be retired. Afterward, Allen said to Crossfield, "Now we know."

Crossfield left the NACA in 1955 to work for North American Aviation on the X-15 rocket-powered research airplane. There, he served as both pilot and design consultant for the revolutionary new aircraft that was carried aloft and launched from beneath the wing of a B-52 for high-speed, high-altitude research missions.

As a result of his extensive rocket plane experience, he was responsible for many of the operational and safety features incorporated into the X-15 and was intimately involved in the vehicle's design. Crossfield piloted its first free flight in 1959 and subsequently qualified the first two X-15s for flight before North American turned them over to NASA and the U.S. Air Force. Altogether, he completed 16 captive-carry (mated to the B-52 launch aircraft), one glide and 13 powered flights in the

X-15, reaching a maximum speed of Mach 2.97 (1,960 miles per hour) and a maximum altitude of 88,116 feet.

Crossfield also was involved in tests of the XLR99 engine – at the time the most powerful and most complex man-rated rocket propulsion system. During a ground run on June 8, 1960, a malfunctioning relief valve and pressurizing gas regulator caused a catastrophic explosion. Although the X-15 was blown in half and engulfed in flames, Crossfield emerged unscathed. He later told a reporter the only casualty was the crease in his trousers. "The firemen got them wet when they sprayed the airplane with water," he explained. "Are you sure it was the firemen?" the reporter asked. Crossfield winced as he pictured the ensuing headline: SPACE SHIP EXPLODES; PILOT WETS PANTS.

In 1960, Crossfield published his autobiography (with Clay Blair Jr.), *Always Another Dawn: The Story of a Rocket Test Pilot* (New York: Arno Press, reprinted 1971) in which he covered his life through the completion of the early X-15 flights.

Following his work with the X-15 Crossfield remained with North American as chief pilot.

"I did the first flights on the T-39 for North American. At that time it was becoming abundantly obvious that aeronautics as we had known it was heading for the doldrums," he told the Dryden History Office. "There was just nothing coming along behind [the X-15]. All of the interest was in space, and that sort of thing."

Crossfield also served for five years as system director responsible for systems test, reliability engineering and quality assurance for

North American Aviation on the Hound Dog missile, Paraglider, Apollo Command and Service Module, and the Saturn V second stage. From 1966 to 1967 he served as technical director for research engineering and test at North American.

Crossfield served as an executive for Eastern Airlines from 1967 to 1973. Then from 1974 to 1975, he was senior vice president for Hawker Siddeley Aviation, setting up its U.S. subsidiary for design, support and marketing of the HS-146 transport in North America. From 1977 until his retirement in 1993, he served as technical consultant to the U.S. House of Representatives Committee on Science and Technology, advising committee members on matters relating to civil aviation. Upon his retirement in 1993, NASA Administrator Daniel S. Goldin awarded him the NASA Distinguished Public Service Medal for his contributions to aeronautics and aviation over a period spanning half a century.

His many other awards included the International Clifford B. Harmon Trophy for 1960 and the Collier Trophy for 1961 from the National Aeronautics Association, both presented by Pres. John F. Kennedy at the White House. He received an honorary doctor of science degree from the Florida Institute of Technology in 1982. Crossfield also has been inducted into the National Aviation Hall of Fame (1983), the International Space Hall of Fame (1988) and the Lancaster, Calif., Aerospace Walk of Honor (1990). In 2002-2003, Crossfield served as technical adviser for the Countdown to Kitty Hawk project, in which an exact reproduction of the 1903

Wright Flyer, as well as several of the Wright brothers' earlier gliders, was built and flown. That project culminated with the airplane's presence at the national Centennial of Flight celebration at Kitty Hawk in December 2003. Crossfield was a founding member and fellow in the Society of Experimental Test Pilots.

Crossfield held single- and multi-engine type ratings and an instrument rating for single-engine general aviation aircraft. In the late 1980s, after 20 years with little flying time, he purchased a 1961 Cessna 210A in which he eventually logged over 2,000 hours. By his 80th birthday in 2001, Crossfield was still flying 200 hours per year with a private pilot/instrument rating.

Throughout his life, Crossfield advocated aerospace education and was a strong supporter of the Civil Air Patrol (Air Force Auxiliary) and, in particular, the CAP's aerospace education program. He created the A. Scott Crossfield Aerospace Education Teacher of the Year Award to recognize and reward teachers for outstanding accomplishments in aerospace education and for dedication to the K-12 students at public, private or parochial schools. Additionally, CAP senior members can qualify for the A. Scott Crossfield Aerospace Education Award. This recognition program is for senior CAP members who have earned the Master Rating in the Aerospace Education Officer Specialty Track.

Although revered for his flying exploits, Crossfield preferred to emphasize his role as a scientist.

"I am an aeronautical engineer, an aerodynamicist and a designer," he told Aviation Week & Space Technology magazine in a 1988 interview. "My flying was only primarily because I felt that it was essential to designing and building better airplanes for pilots to fly."

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Above, Crossfield helps prepare a replica of the Wright brothers' 1903 aircraft for flight. He was instrumental in training four pilots for the Wright Experience Centennial of Flight project in 2003. The image is courtesy of Wright Experience, Inc. photographer Paul Glenshaw. The bottom right NASA photo shows Crossfield returning from a flight in the D-558-II, a research aircraft he flew beyond Mach 2.

A test pilot's final dawn

Scott Crossfield's passion for aeronautics extended throughout his life, career

By Peter W. Merlin
Dryden History Office

Distinguished research pilot and engineer Albert S. "Scott" Crossfield died April 19 when his small plane crashed near Ranger, Ga., during a flight from Prattville, Ala., to Manassas, Va., near his home. As a research pilot, Crossfield flew numerous jet- and rocket-powered aircraft and became the first person to fly twice the speed of sound.

Born in Berkeley, Calif., on Oct. 2, 1921, he took his first flight at age six in a Union Oil Co. airplane piloted by Carl Lienesch, a friend of his father. Although



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Lienesch later claimed young Crossfield, seated in the front cockpit of the wire-and-fabric biplane, fell sound asleep after about 45 minutes the boy was hooked on aviation for life.

At age 12 while working as a delivery boy for the Long Beach Press-Telegram, Crossfield began flying lessons at a small airport in Wilmington, Calif., trading newspaper delivery, sweeping out hangars and washing airplanes for flight time. He became a self-described “airport bum” and gradually acquired many hours of flying experience.

Crossfield not only wanted to fly airplanes; he also wanted to learn how they worked. As a boy, he designed and built radio-controlled flying models. He began formal engineering training at the University of Washington in 1940. Over the next three years he graduated from a civilian aviation school, obtained a private pilot’s license, withdrew from the university, worked for Boeing Aircraft Co., quit that job to join the Army Air Forces, returned briefly to Boeing and finally quit again to join the Navy.

Commissioned an ensign in 1943 following flight training, he served as a fighter and gunnery instructor and maintenance officer before spending six months overseas without seeing combat duty. While in the Navy he flew the F6F and F4U fighters, as well as SNJ trainers, and a variety of other aircraft.

Following the war he resumed his engineering studies under the G.I. bill and joined the naval air reserve unit at Sand Point Naval Air Station, Wash., flying fighter aircraft on weekends while attending the University of Washington. During this time he was a member of the navy acrobatic team, flying FG-1D Corsairs at air shows around the Pacific Northwest. He graduated with a Bachelor of Science degree in aeronautical engineering in 1949 and earned a master’s in aeronautical science the following year.

Crossfield joined the National Ad-



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NASA Photo

Above, a determined Scott Crossfield prepares for an X-15 flight. At top right, Crossfield, in his role as a North American Aviation pilot, delivered X-15 No. 2 in February 1961. Next to him is U.S. Air Force pilot Robert M. White, left, and Neil Armstrong, then a NASA research pilot. Below right, Crossfield prepares the Wright Flyer for action. The Wright Experience images are by photographer Paul Glenshaw and provided courtesy the Wright Experience Inc.

visory Committee for Aeronautics (predecessor of the National Aeronautics and Space Administration) at the High Speed Flight Research Station, Edwards, Calif., as a research pilot in June 1950. During the next five years, he flew the X-1, X-4, X-5, XF-92A, F-51D, F-86F, F9F, B-47A, YF-84, F-84F, F-100A, YF-102, D-558-I and D-558-II. During that time he logged 100 rocket flights, making him the single most experienced rocket pilot.

He made aeronautical history on Nov. 20, 1953, when he became the first person to fly at twice the speed of sound in the D-558-II Skyrocket. Taken aloft in the supersonic, swept-wing research aircraft beneath a Boeing P2B-1S (the Navy designation of the B-29) “mother ship,” he dropped clear of the bomber at 32,000 feet and climbed to 72,000 feet before diving to 62,000 feet, where he became the first pilot to exceed Mach 2 (more than 1,291 mph). His milestone

flight was part of a carefully planned research program with the Skyrocket that featured incremental increases in speed while NACA instrumentation recorded flight data at each increment.

Crossfield found more than his share of excitement during research flights. During the first air launch of the D-558-2 the airplane suffered engine trouble and the windshield iced over. Crossfield had to land without electrical power or radio communications.

“All I could do was put the sun in one place on that windshield and pray that I was right-side up,” he said in a 1998 interview for the Dryden History Office. He managed to operate the radio with battery power and received landing assistance from a chase pilot.

Crossfield’s first X-1 flight began with an unplanned spin, but he managed to right the airplane and complete the mission successfully. On another X-1 flight the wind-

shield iced up during the landing approach.

“I was blind as a bat,” Crossfield recalled. He asked his chase pilot for assistance and improvised a way of clearign the ice away from the inside surface of the windshield. “I was wearing loafers and I got my shoe off and used one of my socks to wipe a hole in the ice so I could see.” After landing he was unable to exit the cockpit because his foot was frozen to the rudder pedal.

Not all of Crossfield’s flights ended successfully. On Aug. 17, 1953, he was forced to abort takeoff from Rogers Dry Lake at Edwards in the delta-winged XF-92A experimental jet. The airplane failed to stop on the runway and Crossfield managed to steer it onto a dirt road, finally coming to a halt well beyond the edge of the lakebed. The road was subsequently nicknamed “Crossfield Pike.”

In another incident, on Sept. 8, 1954, he made a dead-stick landing

in a North American F-100A during its first NACA research flight. After receiving a fire warning signal, Crossfield shut the jet’s engine down and made a gliding approach and landing on the dry lakebed, similar to the type of landings he had performed numerous times in rocket planes. Without power, he coasted across the lakebed and up a concrete ramp to the NACA

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Tribute

“Scott Crossfield was a true pioneer of flight; his contributions led to many discoveries furthering the nation’s aeronautical technology.”

– Kevin Petersen,
Dryden Center Director

“I owe a great deal to Scott Crossfield. His departure from Dryden (then NACA High Speed Flight Research Station) to join North American for the X-15 project pilot job provided the opening that allowed me to transfer from Glenn Research Center (then NACA Lewis Laboratory) and gave me the wonderful opportunities that I enjoyed while flying out of Muroc’s north lake bed.

Scott devoted more than six decades trying to move the aerospace world ever forward. He was successful in that quest many times. He will be missed and well remembered.”

– Neil Armstrong,
Former Dryden research
pilot and NASA astronaut



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NASA Photo

